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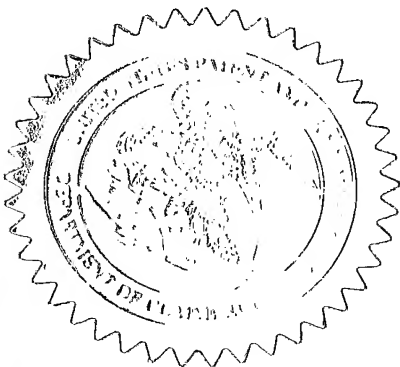
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FILING DATE.

APPLICATION NUMBER: 60/448,135

FILING DATE: February 20, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/04793

By Authority of the  
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# PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

## INVENTOR(S)

Given Name (first and middle (if any))	Family Name or Surname	Residence (City and either State or Foreign Country)
William O.	Walters	Seattle, Wa

☐ Additional inventors are being named on the \_\_\_\_\_ separately numbered sheets attached hereto

## TITLE OF THE INVENTION (500 characters max)

Device For Automatically Loading AND Firing Foam Pellets

Direct all correspondence to:

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## ENCLOSED APPLICATION PARTS (check all that apply)

☒ Specification Number of Pages

☒ Drawing(s) Number of Sheets

☐ Application Data Sheet. See 37 CFR 1.76

☐ CD(s) Number

☐ Other (specify)

## METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27

☐ A check or money order is enclosed to cover the filing fees

☐ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number

☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE  
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80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE

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312-857-1997

Date: 02/19/03

REGISTRATION NO.  
(if appropriate)  
Docket Number

34,809

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## **DEVICE FOR AUTOMATICALLY LOADING AND FIRING FOAM PELLETS**

### **CROSS REFERENCE TO RELATED APPLICATIONS**

#### **FIELD OF THE INVENTION**

This invention relates to an apparatus for the cleaning of tubes. More particularly, to an apparatus for rapid loading and launching foam pellets. Thereby reducing the cost and providing a savings from loss of down time and cost of recovery.

#### **BACKGROUND OF THE INVENTION**

Industry has been looking for ways to clean hydraulic tubing that can replace the current method of vapor degreasing. A vapor degreaser is a large organic solvent still in which the solvent vapor condenses on and drains off the parts to be cleaned. Vapor degreaser systems are large, fixed installations which have a high purchase price and maintenance costs. Companies which use this method must also must obtain a yearly operating permit for there facilities from the Clean Air Agencies because of its potential air pollution and health risks. Replacing these vapor degreasers with a small, low-cost cleaning methods allow installations to consolidate sites and save money.

The pellet system is currently used to clean tubes at a relatively high rate in close quartered work cells. Tubes are bent into a large variety of complicated shapes and lengths. Pellets must be loaded, launched/retrieved and examined with a minimum of operator movement. Equipment which requires the operator to find and fetch the spent pellet lowers productivity. Safety and noise consideration require that the pellets be fired into a containment device and that the noise be reduced to acceptable levels.

One method is to propel a polyurethane foam pellet through the tube using compressed air. The tight fitting foam scrubs the interior wall of the tube as it passes through. This is a widely used technique and there are at least 3 makers of pellets and pellet launching equipment worldwide. One component lacking from the vendors is a rapid firing launcher of the pellets.

This invention provides an innovative, unique and useful alternative to

commercially available pellet launchers for tube cleaning. This attachment speeds up the process and provides productivity improvements because the pellet method allows the user to go from the current batch-processing method to one-piece processing in work cells.

### **SUMMARY OF THE INVENTION**

The present invention provides an innovative, unique and useful alternative to commercially available foam pellet launchers for tube cleaning. This attachment provides a quick and efficient automatic loader and launcher for foam pellets. The invention comprises pellets that are gravity fed through a tubular magazine into a cylindrical vertical passageway in a block. This passageway is intersected at right angle by a cylindrical horizontal passageway about the middle of the block. Below this horizontal passageway the vertical bore has a valved port. The valve releases compressed air into the passageway on a piloted air command. On triggering, the shuttle is pushed into the forward position by the actuator, first blocking the vertical passage, then as it moves farther, the pin pushing the release lever back and releasing the pellets. The pellets drop together until the lowest one rests on top of the shuttle. Once the shuttle is fully forward, an air threshold sensor on the cylinder detects this condition and opens the piloted valve. The compressed air behind pellet forces it through the lower fitting into the flexible hose(not shown) acting as the gun barrel. Thus, ejecting the foam pellet into the tube.

Other features and advantages of the present invention will be apparent from the following description in which the preferred embodiments have been set forth in conjunction with the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The accompanying drawings, which are incorporated in and form part of the specification, illustrate an embodiment of the present invention and together with the description, serve to explain the principles of the invention. In the drawings:

- Figure 1 shows the invention;
- Figure 2 shows an exploded view of the invention;
- Figure 3 shows a cutaway of the invention; and

Figure 4 shows another detail of the invention.

Additional advantages and novel features of the invention will be set forth in part in the description which follows, and in part will become apparent to those skilled in the art upon examination of the following or may be learned by practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

### DETAILED DESCRIPTION OF THE INVENTION

Pellets are gravity fed through a tubular magazine (not shown) into a cylindrical vertical passageway in a block (1). This passageway is intersected at right angle by a cylindrical horizontal passageway about the middle of the block. Below this horizontal passageway the vertical bore has a valved port (11). The valve (10) releases compressed air into the passageway on a piloted air command. Free to slide in the horizontal passageway, a cylindrical shuttle(3) is attached at one end to a pneumatic actuator(8). At its opposite end is a hole slightly larger than and aligning with the vertical bore when the shuttle is extended. Also at this end, the shuttle has a pin (5) through it which extends through slots on opposite sides of the block. This pin can contact a spring loaded release lever (4) and rotate it about an axle (6) through the block. The release lever straddles the block and has a projection which pokes through a small hole intersecting the vertical passageway in the block previously described.

Operation starts with one pellet (a) in the chamber below the air injection port. The shuttle is in the retracted position, the hole in it aligned with the vertical passage. The pin on the shuttle does not contact the lever allowing the projection on the lever to jam the lowest pellet (b) above the shuttle in the vertical passage. No pellets can fall through the hole in the shuttle to the bottom. On triggering, the shuttle is pushed into the forward position by the actuator, first blocking the vertical passage, then as it moves farther, the pin pushing the release lever back and releasing the pellets. The pellets drop together until the lowest one (b) rests on top of the shuttle. Once the shuttle is fully forward, an air threshold sensor

on the cylinder detects this condition and opens the piloted valve. The compressed air behind pellet (a) forces it through the lower fitting (9) into the flexible hose (not shown) acting as the gun barrel. The pellet exits a muzzle at the other end of the hose and is propelled through the tube being cleaned. The shuttle remains in the forward position and air continues to flow as long as the trigger is held down.

When the trigger is released the shuttle moves rearward but before the hole in it realigns with the vertical passage, the projection on the release lever jams the pellet (c) immediately above the one resting on the shuttle. As the shuttle continues to move to the rear position, the hole comes into alignment, and a single pellet (b) falls into the lower portion of the block. The device is now in the starting position again.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An apparatus for the loading and launching of pellets used in tube cleaning comprising:
  - a block having a vertical passageway therethrough;
  - a horizontal passageway along the center axis of said block and intersecting the vertical passageway;
  - a valve port located along the vertical axis of the vertical passageway has a valve for delivering compressed air on demand;
  - an actuator within said horizontal passageway;
  - a cylindrical shuttle attached to said actuator and having the ability to freely move along said horizontal shuttle to a retracted and extended position;
  - a release lever having a pin which extends through slots located on opposite sides of said block; and
  - said release lever straddling the block and having a projection which extends through a hole intersecting the vertical passageway.

**ABSTRACT**

An apparatus for the rapid loading and launching of pellets for tube cleaning. This apparatus allows the user to go from the current batch-processing method to one-piece processing in work cells. The apparatus uses a block configuration to allow gravity feed and rapid firing of pellets into tubes.

Pallet loader  
07-1774

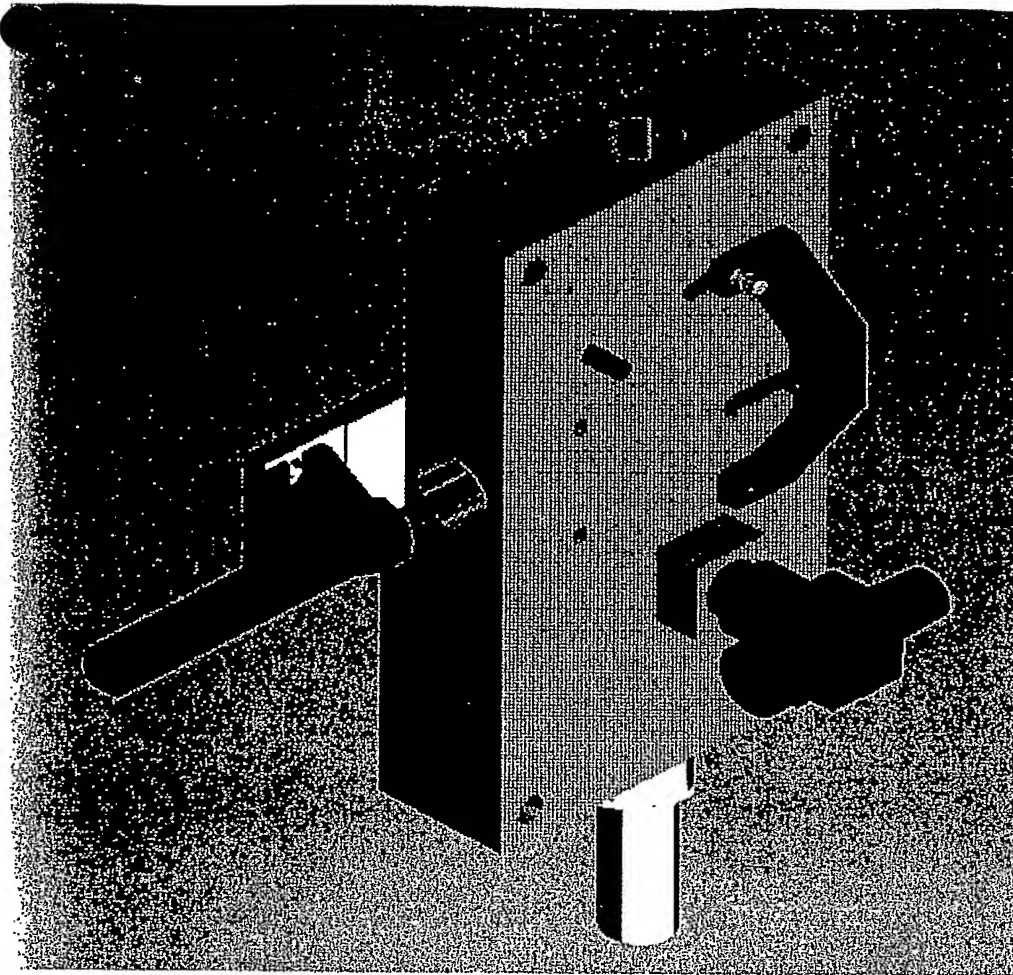


Figure 1



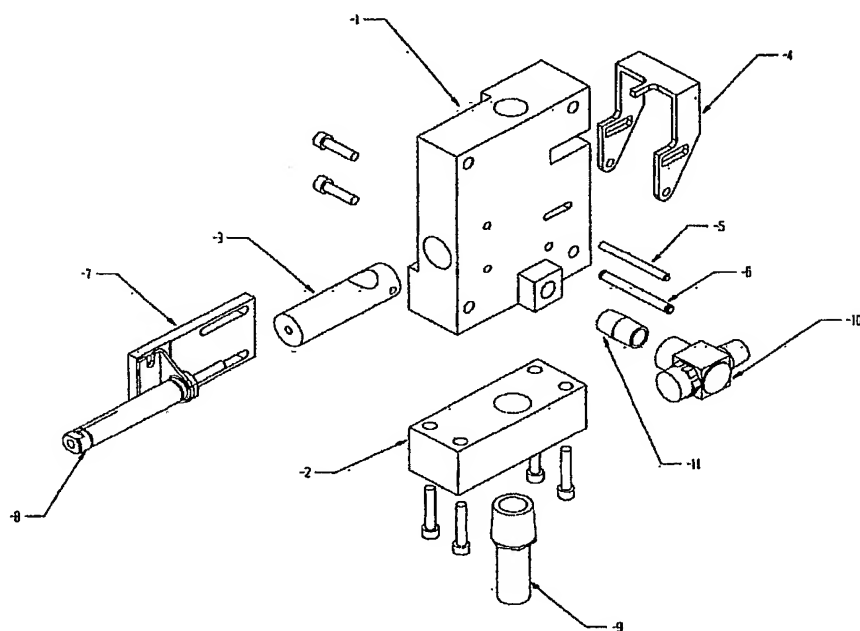


Figure 2

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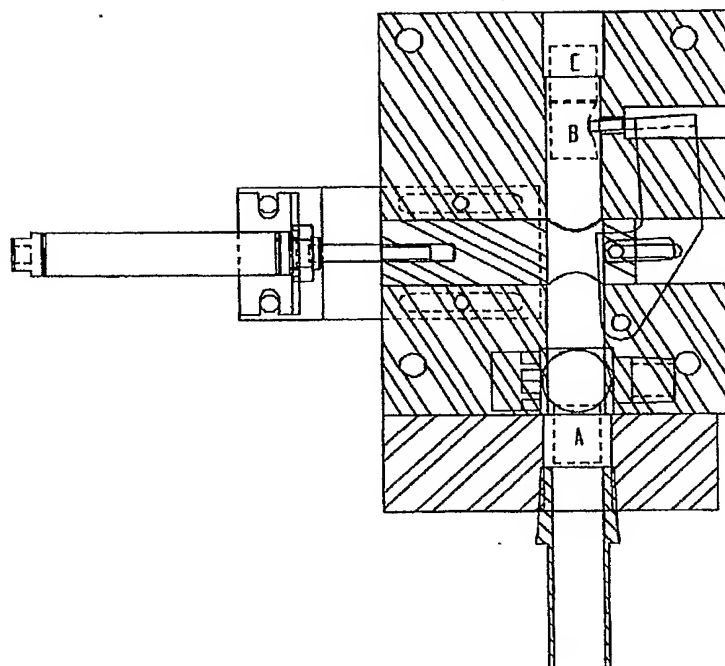


Figure 3

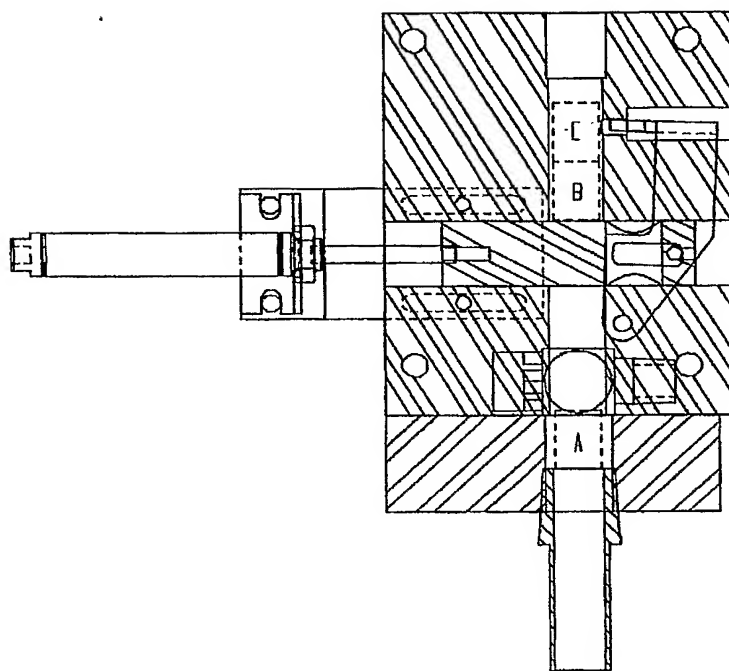


Figure 4